

# Mineral Industry Surveys

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## SULFUR IN SEPTEMBER 2005

During the month, production of recovered elemental sulfur was 627,000 metric tons, according to the U.S. Geological Survey. September production was 23% lower than that of August 2005 and 17% lower than that of September 2004. Shipments were 23% lower than those of August 2005. Producers' ending stocks for September 2005 were 167,000 tons. The dramatic decreases in production and shipments resulted from temporary closures at oil refineries in the Gulf Coast region prompted by Hurricanes Katrina and Rita. For part of September, approximately 40% of domestic sulfur recovery capacity was out of commission. Sulfur production and shipments likely will increase in October, and recover completely by early 2006.

Import and export data for September 2005 were not available at the time of publication and will be published in the Sulfur in October 2005 Mineral Industry Surveys along with apparent consumption. Imports of recovered sulfur for August 2005 were estimated to be 221,000 tons; exports were 71,000 tons. Imports of sulfuric acid for August 2005 were 196,000 tons; exports were 25,000 tons.

Significant adjustments have been made to the sulfur import data. Reports from the U.S. Census Bureau appear to underreport sulfur imports, especially material from Canada. The revised figures are based on Census information and data from personal communications with industry experts.

### Hurricane Update

Both Hurricanes Katrina and Rita, which made landfall in the Gulf Coast area on August 29 and September 24, 2005, respectively, led to decreased sulfur production as a result of precautionary measures taken at oil refineries to prepare for the hurricanes and potential damage caused by the storms.

A total of 28 petroleum refineries were affected to varying degrees by the hurricanes. A few reduced production in preparation for the arrival of either or both storms, but quickly resumed full capacity when it became apparent that those facilities were out of danger. Other refineries experienced brief, but complete shutdowns as the storms passed. Several refineries were damaged by the storms and remained closed until power was restored and repairs were made.

As of November 14, 2005, the majority of these refineries were operating at full capacity. ConocoPhillips Co.'s West Lake, LA, refinery and Lyondell-Citgo Refining, LP's Houston, TX, refinery were operating at reduced rates. BP p.l.c.'s Texas City, TX, refinery was closed, but only partially as a result of Hurricane Rita. Exxon Mobil Corp.'s Chalmette refinery began to restart on November 1 with expectations to reach full capacity within two weeks (Exxon Mobil Corp., 2005<sup>1</sup>). The most seriously damaged refineries from Hurricane Katrina remain closed. ConocoPhillips has not announced when its Alliance refinery will restart. Murphy Oil Co. expects to be able to restart in January 2006 (U.S. Department of Energy, 2005<sup>§</sup>).

### Internet References Cited

Exxon Mobil Corp., 2005, New release—Hurricane Katrina update, accessed November 17, 2005, at URL [http://www.exxonmobil.com/Corporate/Newsroom/NewsReleases/Corp\\_NR\\_NR\\_Katrina6.asp](http://www.exxonmobil.com/Corporate/Newsroom/NewsReleases/Corp_NR_NR_Katrina6.asp).  
U.S. Department of Energy, 2005, Gulf Coast hurricane situation report #40, accessed November 17, 2005, at [http://www.electricity.doe.gov/documents/gulfcoast\\_report\\_111405.pdf](http://www.electricity.doe.gov/documents/gulfcoast_report_111405.pdf).

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<sup>1</sup>References that include a section mark (§) are found in the Internet References Cited section.

TABLE 1  
SALIENT SULFUR STATISTICS<sup>1</sup>

(Thousand metric tons)

| Period                 | Production             |                  |                  | Shipments,<br>all sources | Ending<br>stocks <sup>3</sup> |
|------------------------|------------------------|------------------|------------------|---------------------------|-------------------------------|
|                        | Petroleum <sup>2</sup> | Natural gas      | Total            |                           |                               |
| 2004:                  |                        |                  |                  |                           |                               |
| January-December       | 7,390                  | 1,990            | 9,380            | 9,410                     | XX                            |
| January-September      | 5,500                  | 1,490            | 6,990            | 7,030                     | XX                            |
| September              | 599                    | 155              | 754              | 757                       | 186                           |
| October                | 598                    | 163              | 761              | 765                       | 183                           |
| November               | 622                    | 167              | 789              | 771                       | 200                           |
| December               | 664                    | 167              | 831              | 846                       | 185                           |
| 2005:                  |                        |                  |                  |                           |                               |
| January                | 571                    | 169              | 740              | 740                       | 179                           |
| February               | 547                    | 156              | 703              | 695 <sup>r</sup>          | 188                           |
| March                  | 585                    | 169              | 754              | 755                       | 184                           |
| April                  | 598                    | 157              | 755              | 756                       | 168                           |
| May                    | 612                    | 166              | 778              | 766                       | 178                           |
| June                   | 610                    | 158              | 768              | 765                       | 178                           |
| July                   | 615 <sup>r</sup>       | 159 <sup>r</sup> | 775 <sup>r</sup> | 774 <sup>r</sup>          | 176                           |
| August                 | 641 <sup>r</sup>       | 170 <sup>r</sup> | 811 <sup>r</sup> | 813 <sup>r</sup>          | 175                           |
| September <sup>p</sup> | 480                    | 147              | 627              | 624                       | 167                           |
| Total                  | 5,260                  | 1,450            | 6,710            | 6,690                     | XX                            |

<sup>p</sup>Preliminary. <sup>r</sup>Revised. XX Not applicable.

<sup>1</sup>Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Includes a small quantity from coking operations.

<sup>3</sup>Subject to inventory adjustments.

TABLE 2  
U.S. IMPORTS OF SULFUR<sup>1</sup>

(Thousand metric tons and thousand dollars)

| Period           | Canada                |                    | Mexico   |                    | Total, all countries <sup>2</sup> |                    |
|------------------|-----------------------|--------------------|----------|--------------------|-----------------------------------|--------------------|
|                  | Quantity <sup>e</sup> | Value <sup>3</sup> | Quantity | Value <sup>3</sup> | Quantity <sup>e</sup>             | Value <sup>3</sup> |
| 2004:            |                       |                    |          |                    |                                   |                    |
| January-December | 2,010                 | 31,300             | 545      | 28,200             | 2,850                             | 76,800             |
| January-August   | 1,380                 | 21,800             | 359      | 20,000             | 1,980                             | 54,400             |
| August           | 160                   | 2,050              | 35       | 1,780              | 221                               | 5,290              |
| September        | 160                   | 2,460              | 49       | 2,650              | 240                               | 6,850              |
| October          | 160                   | 1,740              | 51       | 2,170              | 220                               | 4,370              |
| November         | 150                   | 2,650              | 31       | 1,240              | 186                               | 5,700              |
| December         | 160                   | 2,660              | 55       | 2,200              | 226                               | 5,400              |
| 2005:            |                       |                    |          |                    |                                   |                    |
| January          | 140                   | 2,070              | 31       | 1,070              | 234                               | 4,730              |
| February         | 140                   | 2,130              | 50       | 1,930              | 240                               | 6,080              |
| March            | 140                   | 2,320              | 40       | 1,640              | 180                               | 4,050              |
| April            | 170                   | 2,530              | 47       | 1,840              | 254                               | 5,830              |
| May              | 170                   | 1,890              | 40       | 1,570              | 251                               | 5,140              |
| June             | 170                   | 2,460              | 40       | 1,780              | 240                               | 5,670              |
| July             | 170                   | 2,650              | 40       | 1,490              | 218                               | 5,610              |
| August           | 170                   | 2,820              | 20       | 808                | 221                               | 5,040              |
| Total            | 1,270                 | 18,900             | 308      | 12,100             | 1,840                             | 42,200             |

<sup>e</sup>Estimated.

<sup>1</sup>Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>May include other countries not listed.

<sup>3</sup>Declared customs valuation.

Sources: U.S. Census Bureau data as adjusted by U.S. Geological Survey and PentaSul North America Sulphur Service.

TABLE 3  
U.S. IMPORTS OF SULFURIC ACID<sup>1</sup>

(Thousand metric tons and thousand dollars)

| Period           | Canada   |                |                    | Europe   |                |                    | Total, all countries <sup>2</sup> |                |                    |
|------------------|----------|----------------|--------------------|----------|----------------|--------------------|-----------------------------------|----------------|--------------------|
|                  | Quantity | Sulfur content | Value <sup>3</sup> | Quantity | Sulfur content | Value <sup>3</sup> | Quantity                          | Sulfur content | Value <sup>3</sup> |
| 2004:            |          |                |                    |          |                |                    |                                   |                |                    |
| January-December | 1,920    | 628            | 72,500             | 206      | 67             | 6,670              | 2,390                             | 780            | 86,300             |
| January-August   | 1,270    | 414            | 42,800             | 117      | 39             | 2,540              | 1,500                             | 488            | 49,100             |
| August           | 133      | 43             | 4,920              | 33       | 11             | 937                | 194                               | 63             | 6,250              |
| September        | 150      | 49             | 5,080              | 29       | 9              | 1,090              | 206                               | 67             | 6,480              |
| October          | 176      | 58             | 6,450              | 19       | 6              | 946                | 215                               | 70             | 7,480              |
| November         | 160      | 52             | 5,930              | 11       | 4              | 289                | 218                               | 71             | 7,500              |
| December         | 140      | 46             | 4,970              | 30       | 10             | 655                | 251                               | 82             | 7,510              |
| 2005:            |          |                |                    |          |                |                    |                                   |                |                    |
| January          | 173      | 57             | 5,990              | 30       | 10             | 840                | 248                               | 81             | 9,490              |
| February         | 174      | 57             | 6,190              | (4)      | (4)            | 18                 | 213                               | 70             | 7,820              |
| March            | 183      | 60             | 7,080              | 32       | 10             | 759                | 254                               | 83             | 8,590              |
| April            | 191      | 63             | 7,770              | 10       | 3              | 629                | 250                               | 82             | 9,660              |
| May              | 158      | 52             | 6,370              | --       | --             | --                 | 192                               | 63             | 7,080              |
| June             | 144      | 47             | 5,360              | --       | --             | --                 | 189                               | 62             | 6,380              |
| July             | 168      | 55             | 6,840              | (4)      | (4)            | 5                  | 213                               | 70             | 7,790              |
| August           | 156      | 51             | 6,490              | (4)      | (4)            | 83                 | 196                               | 64             | 9,150              |
| Total            | 1,350    | 442            | 52,100             | 72       | 24             | 2,330              | 1,760                             | 575            | 66,000             |

-- Zero.

<sup>1</sup>Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>May include other countries not listed.

<sup>3</sup>Declared customs valuation.

<sup>4</sup>Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 4  
U.S. EXPORTS OF SULFUR AND SULFURIC ACID<sup>1</sup>

(Thousand metric tons and thousand dollars)

| Period           | Sulfur   |                    | Sulfuric acid |                |                    |
|------------------|----------|--------------------|---------------|----------------|--------------------|
|                  | Quantity | Value <sup>2</sup> | Quantity      | Sulfur content | Value <sup>2</sup> |
| 2004:            |          |                    |               |                |                    |
| January-December | 949      | 63,300             | 204           | 67             | 21,300             |
| January-August   | 553      | 33,200             | 137           | 44             | 15,700             |
| August           | 157      | 11,500             | 40            | 13             | 3,210              |
| September        | 107      | 6,590              | 11            | 4              | 1,090              |
| October          | 127      | 7,250              | 23            | 8              | 1,850              |
| November         | 31       | 2,280              | 20            | 7              | 1,590              |
| December         | 130      | 8,740              | 13            | 4              | 1,120              |
| 2005:            |          |                    |               |                |                    |
| January          | 22       | 1,740              | 13            | 4              | 1,590              |
| February         | 72       | 5,040              | 28            | 9              | 2,230              |
| March            | 41       | 6,270              | 31            | 10             | 2,270              |
| April            | 94       | 6,010              | 51            | 17             | 3,280              |
| May              | 16       | 1,850              | 26            | 8              | 2,560              |
| June             | 56       | 5,920              | 38            | 12             | 3,630              |
| July             | 64       | 4,520              | 24            | 8              | 1,920              |
| August           | 71       | 5,330              | 25            | 8              | 2,600              |
| Total            | 436      | 36,700             | 236           | 77             | 20,100             |

<sup>1</sup>Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Declared f.a.s. (free alongside ship) valuation.

Source: U.S. Census Bureau.

TABLE 5  
U.S. CONSUMPTION OF SULFUR<sup>1</sup>

(Thousand metric tons)

| Period           | Domestic sources <sup>2</sup> | Imports <sup>c</sup> | Consumption      |
|------------------|-------------------------------|----------------------|------------------|
| 2004:            |                               |                      |                  |
| January-December | 8,470                         | 2,850                | 11,300           |
| January-August   | 5,730                         | 1,980                | 7,710            |
| August           | 681                           | 221                  | 902              |
| September        | 650                           | 240                  | 890              |
| October          | 638                           | 220                  | 858              |
| November         | 740                           | 186                  | 926              |
| December         | 716                           | 226                  | 942              |
| 2005:            |                               |                      |                  |
| January          | 718                           | 234                  | 952              |
| February         | 623 <sup>r</sup>              | 240                  | 863 <sup>r</sup> |
| March            | 715                           | 180                  | 895              |
| April            | 662                           | 254                  | 916              |
| May              | 750                           | 251                  | 1,000            |
| June             | 709                           | 240                  | 949              |
| July             | 710 <sup>r</sup>              | 218                  | 928 <sup>r</sup> |
| August           | 742                           | 221                  | 963              |
| Total            | 5,630                         | 1,840                | 7,470            |

<sup>c</sup>Estimated. <sup>r</sup>Revised.

<sup>1</sup>Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Calculated as shipments minus exports.

TABLE 6  
RECOVERED SULFUR PRODUCED AND SHIPPED IN THE UNITED STATES,  
BY PAD (PETROLEUM ADMINISTRATION FOR DEFENSE) DISTRICT<sup>1</sup>

(Thousand metric tons)

| District and source       | September 2005 <sup>p</sup> |           | August 2005      |                  | January - September 2005 <sup>2</sup> |           | January - September 2004 <sup>2</sup> |                    |
|---------------------------|-----------------------------|-----------|------------------|------------------|---------------------------------------|-----------|---------------------------------------|--------------------|
|                           | Production                  | Shipments | Production       | Shipments        | Production                            | Shipments | Production                            | Shipments          |
| PAD 1:                    |                             |           |                  |                  |                                       |           |                                       |                    |
| Petroleum and coke        | 16                          | 17        | 14               | 13 <sup>r</sup>  | 159                                   | 159       | 180                                   | 184                |
| Natural gas               | 8                           | 8         | 8                | 8                | 40                                    | 40        | 15                                    | 15                 |
| Total                     | 24                          | 24        | 22               | 21 <sup>r</sup>  | 199                                   | 199       | 195                                   | 199                |
| PAD 2:                    |                             |           |                  |                  |                                       |           |                                       |                    |
| Petroleum and coke        | 86                          | 87        | 112 <sup>r</sup> | 114 <sup>r</sup> | 777                                   | 781       | 709 <sup>r</sup>                      | 712 <sup>r</sup>   |
| Natural gas               | --                          | --        | 3                | 3                | 27                                    | 27        | 31 <sup>r</sup>                       | 32 <sup>r</sup>    |
| Total                     | 86                          | 87        | 115 <sup>r</sup> | 117 <sup>r</sup> | 805                                   | 808       | 740 <sup>r</sup>                      | 744 <sup>r</sup>   |
| PAD 3: <sup>3</sup>       |                             |           |                  |                  |                                       |           |                                       |                    |
| Petroleum and coke        | 269                         | 272       | 403 <sup>r</sup> | 407 <sup>r</sup> | 3,310                                 | 3,320     | 3,550 <sup>r</sup>                    | 3,580 <sup>r</sup> |
| Natural gas               | 39                          | 39        | 42               | 39               | 373                                   | 375       | 384 <sup>r</sup>                      | 382 <sup>r</sup>   |
| Total                     | 308                         | 312       | 445 <sup>r</sup> | 446 <sup>r</sup> | 3,680                                 | 3,690     | 3,940 <sup>r</sup>                    | 3,960 <sup>r</sup> |
| PAD 4 and 5: <sup>4</sup> |                             |           |                  |                  |                                       |           |                                       |                    |
| Petroleum and coke        | 109                         | 104       | 112 <sup>r</sup> | 109 <sup>r</sup> | 1,020                                 | 984       | 1,060 <sup>r</sup>                    | 1,060 <sup>r</sup> |
| Natural gas               | 112                         | 97        | 117 <sup>r</sup> | 119 <sup>r</sup> | 1,010                                 | 1,000     | 1,060 <sup>r</sup>                    | 1,060 <sup>r</sup> |
| California                | 87                          | 82        | 90 <sup>r</sup>  | 87 <sup>r</sup>  | 806                                   | 772       | 809 <sup>r</sup>                      | 807 <sup>r</sup>   |
| Total                     | 208                         | 201       | 229 <sup>r</sup> | 228 <sup>r</sup> | 2,030                                 | 1,990     | 2,120 <sup>r</sup>                    | 2,130 <sup>r</sup> |
| Grand total               | 627                         | 624       | 811 <sup>r</sup> | 813 <sup>r</sup> | 6,710                                 | 6,690     | 6,990 <sup>r</sup>                    | 7,030 <sup>r</sup> |

<sup>p</sup>Preliminary. <sup>r</sup>Revised. -- Zero.

<sup>1</sup>Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>May include revisions.

<sup>3</sup>Includes the U.S. Virgin Islands.

<sup>4</sup>Quantities produced and shipped in California included in petroleum and natural gas. California total shown for information purposes only.

TABLE 7  
COMPARATIVE SULFUR AND SULFURIC ACID STATISTICS<sup>1</sup>

(Million metric tons per year [annualized basis] and dollars per metric ton for period shown)

|  | 2005              |                   |                   | 2004              |
|--|-------------------|-------------------|-------------------|-------------------|
|  | September         | August            | Total             | total             |
| Production   | 7.63 <sup>p</sup> | 9.55 <sup>r</sup> | 8.97 <sup>r</sup> | 9.38              |
| Shipments  | 7.59 <sup>p</sup> | 9.57 <sup>r</sup> | 8.94 <sup>r</sup> | 9.41              |
| Exports of sulfur  | NA                | 0.84              | 0.65              | 0.95              |
| Imports of sulfur:   |                   |                   |                   |                   |
| Canada   | NA                | 2.00 <sup>e</sup> | 1.91 <sup>e</sup> | 2.01              |
| Mexico   | NA                | 0.24              | 0.46              | 0.55              |
| Total <sup>2</sup>   | NA                | 2.60 <sup>e</sup> | 2.76 <sup>e</sup> | 2.85 <sup>e</sup> |
| Export of H <sub>2</sub> SO <sub>4</sub>                   | NA                | 0.29              | 0.35              | 0.20              |
| Import of H <sub>2</sub> SO <sub>4</sub> :                 |                   |                   |                   |                   |
| Canada   | NA                | 1.84              | 2.02              | 1.92              |
| Europe   | NA                | ( <sup>3</sup> )  | 0.11              | 0.21              |
| Total <sup>2</sup>   | NA                | 2.31              | 2.64              | 2.39              |
| Consumption: <sup>4</sup>                                  |                   |                   |                   |                   |
| Domestic sources   | NA                | 8.74              | 8.46              | 8.35              |
| Imports  | NA                | 2.60 <sup>e</sup> | 2.76 <sup>e</sup> | 2.85 <sup>e</sup> |
| Total  | NA                | 11.34             | 11.22             | 11.21             |
| Sulfur export values <sup>5</sup>                          | NA                | \$75              | \$84              | \$67              |
| Sulfur import values: <sup>5</sup>                         |                   |                   |                   |                   |
| Canada   | NA                | \$17              | \$15              | \$16              |
| Mexico   | NA                | \$40              | \$39              | \$52              |
| Average  | NA                | \$23              | \$23              | \$27              |
| H <sub>2</sub> SO <sub>4</sub> export values <sup>5</sup>  | NA                | \$104             | \$85              | \$105             |
| H <sub>2</sub> SO <sub>4</sub> import values: <sup>5</sup> |                   |                   |                   |                   |
| Canada   | NA                | \$42              | \$39              | \$38              |
| Europe   | NA                | \$511             | \$32              | \$32              |
| Average  | NA                | \$47              | \$38              | \$36              |

<sup>e</sup>Estimated. <sup>p</sup>Preliminary. <sup>r</sup>Revised. NA Not available.

<sup>1</sup>Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Includes other countries not listed.

<sup>3</sup>Less than ½ unit.

<sup>4</sup>Because September trade data were not available, September consumption was not determined.

<sup>5</sup>Average value per ton for most recent data available.